



## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
14.01.1998 Bulletin 1998/03

(51) Int Cl.<sup>6</sup> A46B 17/04

(21) Application number: 97304953.9

(22) Date of filing: 07.07.1997

(84) Designated Contracting States:  
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE

(30) Priority: 08.07.1996 ZA 9605781

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(54) A toothbrush accessory or enclosure

(57) A toothbrush enclosure (10) characterized in that it comprises:

a body having a base (12) and a lid (14) which define a cavity dimensioned and shaped to receive a brush portion of the toothbrush (34) therein;

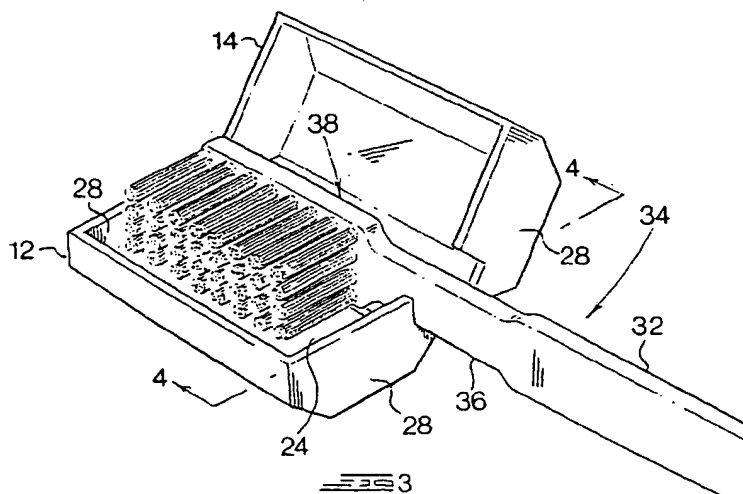
a compartment (20) defined within the cavity by at least one of the base (12) and the lid (14), the compartment (20) being shaped to receive a tablet (18) of sanitising material therein;

a permeable member (24) dimensioned to fit between the compartment (12) and the cavity to allow for gaseous exchange between the cavity and the

compartment (12) to sanitise the brush portion of the toothbrush (34);

a retaining formation (27; 29) defined on or in an interior surface of the body adjacent the compartment (20) to retain the member (24) in position; and

an aperture (30) defined in at least one of the base (12) and lid (14) through which a handle portion (32) of the toothbrush (34) can extend, the aperture (30) being sized so that the body fits snugly around the handle in an area adjacent the brush portion of the toothbrush to retain the enclosure in position around the brush portion.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 2 043 629 A (LYON) 9 June 1936 (1936-06-09) * page 1, left-hand column, line 52 - page 2, left-hand column, line 50; figures * ---	1-7	A46B17/04
A	US 3 884 635 A (SLOAN ELIZABETH) 20 May 1975 (1975-05-20) * column 2, line 59 - column 5, line 6; figures * ---	1-7	
A	US 5 476 333 A (MATTHEWS GEORGIANNE E) 19 December 1995 (1995-12-19) * column 3, line 30 - column 4, line 39; figures * ---	1	
A	US 3 127 985 A (SCOTT) 7 April 1964 (1964-04-07) * column 2, line 7 - column 4, line 10; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A46B
-The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 March 2000	Examiner P. TRIANTAPHILLOU
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 09.92 (P04C01)



European Patent  
Office

Application Number

EP 97 30 4953

### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-7



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-7

A toothbrush enclosure.

2. Claims: 8-10

A sanitising composition for a thoothbrush.

ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 97 30 4953

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-03-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2043629 A	09-06-1936	NONE	
US 3884635 A	20-05-1975	NONE	
US 5476333 A	19-12-1995	NONE	
US 3127985 A	07-04-1964	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

## Description

**BACKGROUND OF THE INVENTION**

5 THIS invention relates to a toothbrush accessory or enclosure.

It is usual for a toothbrush to be kept and re-used for many months. Because the toothbrush is used to clean the mouth area and because it is often wet or damp, it is an ideal environment for bacterial growth and a toothbrush typically contains large amounts of bacteria and other disease-causing micro-organisms. Also, toothbrushes are often also left open and exposed to the atmosphere and thus to bacteria and other disease-causing micro-organisms present in the atmosphere.

10 Conventional rinsing of a toothbrush in water is not sufficient to clean the toothbrush properly and bacteria and other disease-causing micro-organisms may grow and accumulate on and in the brush portion of the toothbrush. The bacteria and micro-organisms are then transmitted from there to the mouth of a user each time the brush is used.

15 **SUMMARY OF THE INVENTION**

According to the invention a toothbrush enclosure comprises:

20 a body having a base and a lid which define a cavity dimensioned and shaped to receive a brush portion of the toothbrush therein;

a compartment defined within the cavity by at least one of the base and the lid, the compartment being shaped to receive a tablet of sanitising material therein;

25 a permeable member dimensioned to fit between the compartment and the cavity to allow for gaseous exchange between the cavity and the compartment to sanitise the brush portion of the toothbrush;

a retaining formation defined on or in an interior surface of the body adjacent the compartment to retain the member in position; and

30 an aperture defined in at least one of the base and lid through which a handle portion of the toothbrush can extend, the aperture being sized so that the body fits snugly around the handle in an area adjacent the brush portion of the toothbrush to retain the enclosure in position around the brush portion.

35 Sanitise, sanitising or sanitary agent as used herein mean any agent which improves the hygiene of the brush portion of a toothbrush with regard to dirt and infection and may include sterilising means and sterilising agents, disinfecting means and disinfecting agents, deodorising means and deodorising agents, odourising means and odourising agents, antiseptic means and antiseptic agents, germicides and antibacterial means and antibacterial agents.

40 The permeable member may be a perforated cover plate which spans the base and which has inwardly angled edges which engage the retaining formation.

The retaining formation may be a ridge or a groove defined on or in the interior surface of at least two opposed sides of the base.

45 The compartment is preferably integrally formed with the body and preferably comprises an upstanding side wall extending from the base, the compartment being positioned so that the tablet of sanitising material is positioned beneath the brush portion of the toothbrush when it is received within the cavity.

The compartment may be hemispherical.

The enclosure preferably also includes a hinge between the base and the lid, the hinge being formed integrally with the base and the lid.

The hinge may be a snap-type hinge.

50 The sanitising means may be a solid tablet or a capsule containing sanitising material.

The sanitising material may comprise, separately or in combination, thymol, chlorocresol, glutaraldehyde and phenol.

The sanitising material may also comprise any approved carrier or excipient, such as dicalcium phosphate.

55 The body is preferably made of a polymeric material. The polymeric material is preferably a plastics material or a resinous material. More preferably, the polymeric material is a plastics material selected from polypropylene and high density polyethylene. It may be moulded from the polymeric material, for example, by injection moulding.

The polymeric material may have an odourising or deodorising material incorporated therein during formulation.

According to another aspect of the invention a toothbrush sanitising material comprises a tablet containing thymol

and a carrier.

The carrier may be dicalcium phosphate.

The tablet may contain about 250 mg of thymol.

According to another aspect of the invention a method of sanitising a toothbrush comprises placing it in a toothbrush enclosure of the invention for a period of time.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings in which:

**Figure 1** is a pictorial view of a toothbrush accessory of the invention in an open configuration;

**Figure 2** is a sectional side view on 2-2 through the toothbrush accessory of Figure 1;

**Figure 3** is a pictorial view of a toothbrush accessory of the invention in an open configuration and with a toothbrush received therein;

**Figure 4** is a sectional side view on 4-4 through the toothbrush accessory of Figure 3 but in a closed configuration; and

**Figure 5** is a sectional side view on a toothbrush accessory of the invention with an alternative form of cover plate.

### **DETAILED DESCRIPTION OF THE INVENTION**

The toothbrush accessory or enclosure of the invention, generally designated 10 in the attached figures, comprises a body defining a base 12 and a lid 14, hinged to one another by means of an integrally formed resilient snap-type hinge 16. Together, the base 12 and the lid 14 form a generally rectangular and box-shaped enclosure 10 defining an internal cavity and having top and bottom sides and endwalls 28. The cavity is shaped and dimensioned to receive and contain the brush portion of a toothbrush within it with sufficient space around the bristles so that air can circulate around them and so that the bristles of the brush do not come into contact with an interior surface of the body. The enclosure does, however, fit snugly around the brush portion of the toothbrush and is thus small and easily transportable. Because the cavity is dimensioned to receive only a single toothbrush, it can be effectively sanitised in a relatively short period of time by the sanitising means (described more fully below). This is the case even if the toothbrush is removed from and replaced within the enclosure a number of times in a day.

The base 12 and lid 14 are integrally moulded from a polymeric plastics material, which may be polypropylene or high density polyethylene, and each has a wall thickness of about 1mm. They are mirror images of one another and form a bottom half and top half respectively of the enclosure 10. The resilient hinge 16 runs alongside two adjoining surfaces of the base 12 and lid 14 and biases their unhinged surfaces towards one another to close the enclosure 10 and to maintain the enclosure 10 in a closed configuration. Thus, by gripping the body and applying a slight pressure against the resilient hinge, the enclosure 10 can be snapped open and by forcing the base and lid towards one another, the enclosure 10 can be snapped shut.

Contained within the enclosure is suitable sanitising means. The sanitising means contains a sanitising material, which may be a disinfectant material, and optionally also an odourising material, for disinfecting the brush portion of the toothbrush. The sanitising material is contained within a compressed solid tablet 18 held within a compartment 20 formed integrally in the base 12 as shown in Figures 2 and 4. The compartment 20 is sized so that the tablet 18 fits snugly into it. The tablet 18 will therefore be just slightly smaller than the compartment 20. This ensures that the tablet 18 is held in position and does not move around within the compartment, which movement may result in breaking or flaking of the tablet with the movement of the toothbrush.

The compartment 20, which is approximately 1.5 mm high and has a diameter of approximately 5mm, is formed by an upstanding rigid side wall 22 formed integrally with the bottom surface 23 of the base 12. It is positioned so that when a toothbrush is received within the body, the tablet 18 is situated beneath and substantially in the middle of the brush portion. This ensures that there is optimum dispersal of the sanitising material through the bristles. The space between the tablet and the closest bristles is sufficient to allow for an efficient circulation of the sublimated sanitising material around the entire brush portion.

A cover plate 24, which has a shape corresponding to that of the interior of the base 12, fits over the compartment 20. It is retained in position by fitting under an outwardly extending rounded retaining ridge 27, which is formed integrally with the walls of the base 12. The ridge is shaped and dimensioned so that it is easy to fit the cover plate 24 in position

over the compartment 20 during assembly of the enclosure 10 by pushing the edges of the cover plate 24 over the ridge but so that the cover plate is also held firmly in position during subsequent use of the enclosure. The cover plate 24 can alternatively be held in position by fitting into a groove 29 formed in the walls of the base as shown in Figure 5. The cover plate 24 spans the base 12 so that it cannot easily be dislodged during use which may lead to breakage or loss of the tableted sanitising material.

The corners of the enclosure 10 are cut off so that it is an octagonal structure. This streamlines it and makes it easier to fit into restricted spaces for transport.

The edges of the cover plate 24, as can be seen in Figure 4, can be angled inwardly to ensure that it fits snugly against the correspondingly angled sides of the base 12 and underneath the ridge 27 and is not easily removable. The edges of the cover plate 24, as can be seen from Figure 5, can also be rounded outwardly to ensure that it fits snugly into the groove 29 and is not easily removable. The cover plate 24 has numerous perforations 36 defined in it, each having a diameter of approximately 0.55mm, to allow the sanitising material contained within the tablet 18 to permeate into and flow around the entire interior of the enclosure. Although the tablet is well compressed and should not flake or disintegrate, the perforations in the cover plate 24 are sized to ensure that if any such flaking does occur, the flakes will be trapped by the cover plate 24 and kept away from the bristles of the toothbrush.

At one end of the enclosure 10 an opening 30 is defined through which the neck portion 36 of the handle or shaft 32 of a toothbrush 34 can extend when the toothbrush 34 is received within the enclosure, as shown in Figure 3. The opening 30 is formed partly by a cut away section 30a formed in the base 12 and partly by a cutaway section 30b formed in the lid 14. The cutaways 30a and 30b are dimensioned so that the surrounding endwall 28 fits snugly around the neck 36 of the toothbrush in an area just below the brush portion. When the enclosure 10 is closed, the brush portion is therefore held securely within the enclosure 10 without the bristles coming into contact with the cover plate 24 yet with the tablet positioned just under them and with sufficient space around the bristles as seen in Figure 4. The back 38 of the brush portion is positioned against a side of the enclosure so that the brush is held firmly within the enclosure and does not move around within it.

The sanitising material contains any one or more of a number of suitable active vapourisable disinfectant or antiseptic chemicals, including thymol, chlorocresol, glutaraldehyde and phenol admixed with a suitable carrier or carriers or excipient or excipients and compressed into the tablet 18. The sanitising material may comprise a combination of these disinfectant chemicals in addition to an odourising or deodorising material or other antiseptic or antibacterial means. The chemicals should be capable of vapourising or sublimating to disinfect the bristles. The vapourised chemical will come into contact with the brush portion of the toothbrush and flow between the bristles to kill bacteria or other disease causing or micro-organisms which may be present.

The amount of active material may vary but in all cases it must be sufficient to cleanse and sterilise the brush portion and to have an active life of approximately three months. The effective amount may be determined by routine experimentation. Typically, a tablet contains 50% by weight of vapourisable disinfectant materials and 50% by weight of a carrier.

Thymol, which is in the form of colourless crystals, is a phenolic antiseptic with both antibacterial and anti-fungal properties. It has been used in a variety of oral and dental products. In a preferred tablet of the invention, thymol is mixed directly with the compressible inactive excipient dicalcium phosphate. The tablet typically contains approximately 200 to 250 mg of thymol and the same amount of dicalcium phosphate and will remain effective in inhibiting the growth of the most common oral bacteria for periods of three months and longer. A tablet of the invention may contain up to 1g of thymol and up to 1g of dicalcium phosphate.

The most important micro-organisms causing tooth decay in the mouth are:

1. Streptococcus mutans;
2. Streptococcus sorbrinus; and
3. Lactobacillus caseii.

The most important micro-organisms causing periodontal gum disease in the mouth are:

1. Actinobacillus actinomyceterncomitens;
2. Porphyromonas gingivalis; and
3. Prevotella intermedia.

Tests were conducted on:

- i. uncovered toothbrushes from volunteers in the middle to upper economic classes with an age variation of from 4 to 75 years, none of whom had a full set of dentures although some had partial dentures; and